

CLAIMS

1. In a submount equipped with a submount substrate and a solder layer formed on a primary surface of said submount substrate,

5 a submount wherein the density of said solder layer before melting is at least 50% and no more than 99.9% of the theoretical density of the material used in said solder layer.

2. A submount as described in claim 1 wherein said solder layer contains at least one of the following list: gold-tin alloy; silver-tin alloy; and
10 lead-tin alloy.

3. A submount as described in claim 1 wherein said solder layer before melting is formed on said submount substrate and includes a first layer having silver as a main component and a second layer, formed on said first layer, having tin as a main component.

15 4. A submount as described in any one of claim 1 through claim 3 further comprising an electrode layer formed between said submount substrate and said solder layer.

5. A submount as described in claim 4 wherein said electrode layer contains gold.

20 6. A submount as described in claim 4 or claim 5 further comprising a solder adhesion layer formed between said solder layer and said electrode layer;

wherein said solder adhesion layer contains: a noble metal layer

disposed on said solder layer side and having as a main component at least one of the following list: gold, platinum, palladium, and alloys thereof; and a transition element layer disposed on said electrode layer side and having as a main component at least one of the following list: titanium; vanadium;
5 chromium; zirconium; niobium; and alloys thereof.

7. A submount as described in any one of claim 1 through claim 6 further comprising an adhesion layer and a diffusion barrier layer formed between said submount substrate and said solder layer;

wherein:

10 said adhesion layer is formed so as to be in contact with said primary surface of said submount substrate; and

said diffusion barrier layer is formed on said adhesion layer.

8. A submount as described in claim 7 wherein said adhesion layer contains titanium and said diffusion barrier layer contains platinum.

15 9. A submount as described in any one of claim 1 through claim 8 wherein said submount substrate contains sintered aluminum nitride or sintered alumina.

10. A semiconductor device comprising:

a submount as described in any one of claim 1 through claim 9; and

20 a semiconductor light-emitting element mounted on said solder layer of said submount.